

Algorithm for file updates in Python

Project description

I work as a cybersecurity analyst to restrict access to users based on IP addresses. My role includes managing an *allow list* that grants access, and a *remove list* to revoke permissions. In this project, I use Python to update a text file by removing unauthorized IP addresses.

Open the file that contains the allow list

To begin, I defined the name of the file as `"allow_list.txt"` and created a list of IP addresses called `remove_list` that should be removed from the file. Then I used the `with open()` statement to open the file in read mode `"r"`.

```
| # Assign `import_file` to the name of the file
import_file = "allow_list.txt"

# Assign `remove_list` to a list of IP addresses that are no longer allowed to access restricted information.
remove_list = ["192.168.97.225", "192.168.158.170", "192.168.201.40", "192.168.58.57"]

# First line of `with` statement
with open(import_file, "r") as file:
```

Read the file contents

This section reads the contents of the file `allow_list.txt` using the `.read()` method and stores it in the variable `ip_addresses`.

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# Build `with` statement to read in the initial contents of the file
with open(import_file, "r") as file:

    # Use `.read()` to read the imported file and store it in a variable named `ip_addresses`
    ip_addresses = file.read()

# Display `ip_addresses`
print(ip_addresses)
```

Convert the string into a list

The `.read()` method returns a long string of text. I used the `.split()` method to break it into a list of individual IP addresses so I could work with each item separately.

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# Build `with` statement to read in the initial contents of the file
with open(import_file, "r") as file:
    # Use `.read()` to read the imported file and store it in a variable named `ip_addresses`
    ip_addresses = file.read()

# Use `.split()` to convert `ip_addresses` from a string to a list
ip_addresses = ip_addresses.split()

# Build iterative statement
# Name loop variable `element`
# Loop through `ip_addresses`
for element in ip_addresses:
    # Display `element` in every iteration
    print(element)
```

Iterate through the remove list

To remove specific IPs, I used a `for` loop to iterate over each item in the `ip_addresses` list and check if any of them are in the `remove_list`.

```

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# Build `with` statement to read in the initial contents of the file
with open(import_file, "r") as file:

    # Use `.read()` to read the imported file and store it in a variable named `ip_addresses`
    ip_addresses = file.read()

# Use `.split()` to convert `ip_addresses` from a string to a list
ip_addresses = ip_addresses.split()

# Build iterative statement
# Name loop variable `element`
# Loop through `ip_addresses`
for element in ip_addresses:
    # Display `element` in every iteration
    print(element)

```

ip_address

Remove IP addresses that are on the remove list

The `if` statement inside the loop checks if an element from the allow list exists in the remove list. If so, it removes it using `.remove()`.

```

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remove_list = ["192.168.97.225", "192.168.158.170", "192.168.201.40", "192.168.58.57"]

# Build `with` statement to read in the initial contents of the file
with open(import_file, "r") as file:

    # Use `.read()` to read the imported file and store it in a variable named `ip_addresses`
    ip_addresses = file.read()

# Use `.split()` to convert `ip_addresses` from a string to a list
ip_addresses = ip_addresses.split()

# Build iterative statement
# Name loop variable `element`
# Loop through `ip_addresses`
for element in ip_addresses:
    # Build conditional statement
    # If current element is in `remove_list`,
    if element in remove_list:
        # then current element should be removed from `ip_addresses`
        ip_addresses.remove(element)
# Display `ip_addresses`
print(ip_addresses)

```

Update the file with the revised list of IP addresses

After removing the IPs, I used " ".join() to convert the list back into a single string and opened the file in write mode "w" to overwrite the old contents with the updated list.

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remove_list = ["192.168.97.225", "192.168.158.170", "192.168.201.40", "192.168.58.57"]

# Build `with` statement to read in the initial contents of the file
with open(import_file, "r") as file:

    # Use `.read()` to read the imported file and store it in a variable named `ip_addresses`
    ip_addresses = file.read()

# Use `.split()` to convert `ip_addresses` from a string to a list
ip_addresses = ip_addresses.split()

# Build iterative statement
# Name loop variable `element`
# Loop through `ip_addresses`
for element in ip_addresses:

    # Build conditional statement
    # If current element is in `remove_list`,
    if element in remove_list:

        # then current element should be removed from `ip_addresses`
        ip_addresses.remove(element)

# Convert `ip_addresses` back to a string so that it can be written into the text file
ip_addresses = " ".join(ip_addresses)

# Build `with` statement to rewrite the original file
with open(import_file, "w") as file:

    # Rewrite the file, replacing its contents with `ip_addresses`
    file.write(ip_addresses)
```

Summary

In this project, I used Python to automate the task of updating an allow list by removing unauthorized IP addresses. The script reads a text file containing allowed IPs, compares each entry against a separate list of IPs to be removed, and rewrites the file with only the valid IPs remaining. This process helps maintain accurate access control and demonstrates how automation can streamline routine cybersecurity tasks.